

What is claimed is:

- 1     1.     A data sort method, comprising:
  - 2             obtaining a plurality of data records and, for each data record
  - 3                 extracting key information,
  - 4                 expanding the extracted key information, and
  - 5                 storing the expanded key information in a key record;
  - 6             sorting the plurality of key records based on the expanded key
  - 7     information;
  - 8             reorganizing the plurality of data records to correspond to the order of the
  - 9     sorted plurality of key records; and
  - 10            storing the reorganized plurality of data records without their associated
  - 11   expanded key information to a working storage.
- 1     2.     The method of claim 1, wherein the act of obtaining comprises obtaining
- 2     data records from one or more storage devices.
- 1     3.     The method of claim 1, wherein the act of extracting comprises:
  - 2             determining a starting location for a first key field; and
  - 3             calculating the starting location of a subsequent key field based on the
  - 4     determined starting location of the first key field.

- 1 4. The method of claim 3, wherein the act of determining comprises  
2 obtaining the starting location of the first key field from a sort control card.
- 1 5. The method of claim 4, wherein the sort control card comprises a  
2 parameter list.
- 1 6. The method of claim 4, wherein the sort control card identifies a starting  
2 position for each key field in a record relative to a first key field of the record.
- 1 7. The method of claim 4, wherein the sort control card further indicates a  
2 data type for each key field in a record.
- 1 8. The method of claim 7, wherein the sort control card further indicates a  
2 sort order for each key field in a record.
- 1 9. The method of claim 1, wherein the act of expanding comprises adjusting  
2 each key field to a fixed length.
- 1 10. The method of claim 1, wherein the act of storing the expanded key  
2 information in a key record further comprises, associating a value with each key  
3 record that identifies the data record from which the expanded key information  
4 was extracted.

1 11. The method of claim 10, wherein the act of storing the expanded key  
2 information in a key record does not comprise storing a data field from the data  
3 record associated with the key record.

1 12. The method of claim 1, wherein the working storage comprises one or  
2 more direct access storage devices.

1 13. The method of claim 1, further comprising repeating the acts of obtaining,  
2 sorting, reorganizing and storing for at least a second plurality of data records.

1 14. The method of claim 13, further comprising merging the two or more  
2 plurality of reorganized data records.

1 15. The method of claim 14, wherein the act of obtaining a plurality of data  
2 records comprises obtaining a plurality of DB2 data records and the act of  
3 merging further comprises reloading the merged plurality of reorganized data  
4 records into the DB2 data object.

1 16. A method for sorting an object, the object having a plurality of records,  
2 each record having a plurality of key fields at least one of which is a variable  
3 length key field, the method comprising:  
4 retrieving a plurality of records of an object;  
5 extracting each key field in a record into a fixed length component of a  
6 corresponding key record;  
7 sorting the plurality of key records based on the extracted fixed length  
8 components;  
9 reordering the plurality of records based on the sorted plurality of key  
10 records; and  
11 storing the reordered plurality of records in an intermediate storage,  
12 wherein the act of storing does not include storing fixed length components of a  
13 key record.

1 17. The method of claim 16, wherein the act of retrieving comprises retrieving  
2 data records from one or more storage devices.

1 18. The method of claim 16, wherein the act of extracting comprises using a  
2 sort control card to determine the starting locations of each of the plurality of  
3 key fields.

1 19. The method of claim 18, wherein the sort control card comprises a  
2 parameter list.

1 20. The method of claim 18, wherein the sort control card further indicates a  
2 data type for each key field in a record.

1 21. The method of claim 20, wherein the sort control card further indicates a  
2 sort order for each key field in a record.

1 22. The method of claim 16, wherein the act of extracting each key field in a  
2 record into a fixed length component comprises expanding each key field to a  
3 maximum length.

1 23. The method of claim 16, wherein the act of extracting further comprises  
2 associating a value with each key record that identifies the data record from  
3 which the key was extracted.

1 24. The method of claim 23, wherein the act of extracting each key field in a  
2 record into a fixed length component of a corresponding key record does not  
3 comprise storing data fields associated with the data record in the key record.

1 25. The method of claim 16, further comprising repeating the acts of  
2 retrieving, extracting, sorting, reordering and storing for at least a second  
3 plurality of records.

1 26. The method of claim 25, further comprising merging the two or more  
2 plurality of reordered records.

1 27. A program storage device, readable by a programmable control device,  
2 comprising instructions stored on the program storage device for causing the  
3 programmable control device to:

4 obtain a plurality of data records from a data object and, for each data  
5 record (1) extract key information, (2) expand the extracted key information,  
6 and (3) store the expanded key information in a key record;

7 sort the plurality of key records based on the expanded key information;

8 reorganize the plurality of data records to correspond to the order of the  
9 sorted plurality of key records; and

10 store the reorganized plurality of data records without their associated  
11 expanded key information to a working storage.

1 28. The program storage device of claim 27, wherein the instructions to  
2 obtain comprise instructions to obtain data records from one or more storage  
3 devices.

1 29. The program storage device of claim 27, wherein the instructions to

2 extract comprise instructions to:

3 determine a starting location for a first key field; and

4 calculate the starting location of a subsequent key field based on the

5 determined starting location of the first key field.

1 30. The program storage device of claim 29, wherein the instructions to

2 determine comprise instructions to obtain the starting location of the first key

3 field from a sort control card.

1 31. The program storage device of claim 30, wherein the sort control card

2 comprises a parameter list.

1 32. The program storage device of claim 30, wherein the sort control card

2 identifies a starting position for each key field in a record relative to a first key

3 field of the record.

1 33. The program storage device of claim 30, wherein the sort control card

2 further indicates a data type for each key field in a record.

1 34. The program storage device of claim 33, wherein the sort control card  
2 further indicates a sort order for each key field in a record.

1 35. The program storage device of claim 27, wherein the instructions to  
2 expand comprise instructions to adjust each key field to a fixed length.

1 36. The program storage device of claim 27, wherein the instructions to store  
2 the expanded key information in a key record further comprise instructions to  
3 associate a value with each key record that identifies the data record from which  
4 the expanded key information was extracted.

1 37. The program storage device of claim 36, wherein the instructions to store  
2 the expanded key information in a key record do not comprise instructions to  
3 store a data field of the data record associated with the key record.

1 38. The program storage device of claim 27, wherein the instructions to  
2 obtain, sort, reorganize and store are performed for at least a second plurality of  
3 data records.

1 39. The program storage device of claim 38, further comprising instructions to  
2 merge the two or more plurality of reorganized data records.

1 40. A sorting system comprising:

2 memory means for storing a data object and instructions; and

3 processing means, communicatively coupled to the memory means, for

4 executing the instructions to cause the processing means to –

5 obtain a plurality of data records from the data object and, for each

6 data record (1) extract key information, (2) expand the extracted key

7 information, and (3) store the expanded key information in a key record,

8 sort the plurality of key records based on the expanded key

9 information,

10 reorganize the plurality of data records to correspond to the order

11 of the sorted plurality of key records, and

12 store the reorganized plurality of data records without their

13 associated expanded key information to a working storage.

1 41. The sorting system of claim 40, wherein the memory means comprises

2 two or more storage devices coupled by a communications network.

1 42. The sorting system of claim 41, wherein the data object comprises a first

2 plurality of records stored on a first storage device and a second plurality of

3 records stored on a second storage device.

1 43. The sorting system of claim 40, wherein the processing means comprises  
2 two or more communicatively coupled computer processors.

1 44. The sorting system of claim 40, wherein the instructions to extract  
2 comprise instructions to:  
3 determine a starting location for a first key field; and  
4 calculate the starting location of a subsequent key field based on the  
5 determined starting location of the first key field.

1 45. The sorting system of claim 44, wherein the instructions to determine  
2 comprise instructions to obtain the starting location of the first key field from a  
3 sort control card.

1 46. The sorting system of claim 45, wherein the sort control card comprises a  
2 parameter list.

1 47. The sorting system of claim 45, wherein the sort control card identifies a  
2 starting position for each key field in a record relative to a first key field of the  
3 record.

1 48. The sorting system of claim 45, wherein the sort control card further  
2 indicates a data type for each key field in a record.

1 49. The sorting system of claim 48, wherein the sort control card further  
2 indicates a sort order for each key field in a record.

1 50. The sorting system of claim 40, wherein the instructions to expand  
2 comprise instructions to adjust each key field to a fixed length.

1 51. The sorting system of claim 40, wherein the instructions to store the  
2 expanded key information in a key record further comprise instructions to  
3 associate a value with each key record that identifies the data record from which  
4 the expanded key information was extracted.

1 52. The sorting system of claim 51, wherein the instructions to store the  
2 expanded key information in a key record does not comprise instructions to store  
3 data fields associated with the data record in the key record.

1 53. The sorting system of claim 40, wherein the instructions to obtain, sort,  
2 reorganize and store are performed for at least a second plurality of data  
3 records.

1 54. The sorting system of claim 53, further comprising instructions to merge  
2 the two or more plurality of reorganized data records.

1 55. A data sort method, comprising:

2 obtaining a plurality of data records from a database object, for each of  
3 the plurality of data records –

4 extracting key information,

5 expanding the extracted key information, and

6 storing the expanded key information in a key record;

7 sorting the plurality of key records based on the expanded key  
8 information;

9 reorganizing the plurality of data records to correspond to the order of the  
10 sorted plurality of key records;

11 storing the reorganized plurality of data records without their associated  
12 expanded key information in a working storage;

13 repeating the acts of obtaining, sorting, reorganizing and storing for at  
14 least a second plurality of data records;

15 merging the at least two plurality of reorganized data records; and

16 re-loading the merged plurality of reorganized data records into the database  
17 object.

1 56. The data sort method of claim 55, wherein the act of extracting comprises

2 obtaining the starting location of a first key field in a data record from a sort

3 control card.

1 57. The data sort method of claim 56, wherein the sort control card identifies  
2 a starting position for each key field in a record relative to a first key field of the  
3 record.

1 58. The data sort method of claim 56, wherein the sort control card further  
2 indicates a data type for each key field in a record.

1 59. The data sort method of claim 58, wherein the sort control card further  
2 indicates a sort order for each key field in a record.

1 60. The data sort method of claim 58, wherein the sort control card comprises  
2 a parameter list.

1 61. The data sort method of claim 55, wherein the act of expanding comprises  
2 adjusting each key field to a fixed length.

1 62. The data sort method of claim 55, wherein the act of storing the  
2 expanded key information in a key record further comprises, associating a value  
3 with each key record that identifies the data record from which the expanded  
4 key information was extracted.

1 63. The data sort method of claim 62, wherein the act of storing the  
2 expanded key information in a key record does not comprise storing a data field  
3 from the data record associated with the key record.

1 64. A memory for storing a data structure for access by a sort program being  
2 executed on a data processing system, the data structure comprising:  
3 a starting location indicator for a first key field in a data object record;  
4 a maximum length indicator associated with the first key field;  
5 a field type indicator associated with the first key field;  
6 a sort-order indicator associated with the first key field; and  
7 starting, maximum length, field type and sort-order indicators for at least  
8 a second key field.

1 65. The memory of claim 64, wherein the data structure further comprises  
2 starting location, length, field type and sort-order indicators for at least one data  
3 field in the data object record, wherein the sort-order indicator is set to a value  
4 indicative of a non-key field.

1 66. The memory of claim 64, wherein the starting location indicator for each  
2 field subsequent to a variable length field is set to a value to indicate that a prior  
3 field is a variable length field.

1    67.    The memory of claim 64, wherein the field type indicator indicates a field  
2    type selected from the group consisting of a floating point number, an integer, a  
3    Boolean value, a binary value and a character value.

1    68.    The memory of claim 67, wherein the field type indicator further  
2    comprises an indication of whether a field is a variable length field or fixed length  
3    field.

1    69.    The memory of claim 64, wherein the sort-order indicator indicates an  
2    ascending sort or a descending sort order.